



STRUCTURAL LADDERS, STAIRS PLATFORM AND HAND RAILINGS FOR USE IN PLANTS & DEPARTMENTS

Safety Standard

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	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 2 of 37
		13 th July 2016

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	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 3 of 37
		13 th July 2016

Table of Contents

1.0 Purpose.....	4
2.0 Reference.....	4
3.0 Applicability	4
4.0 Responsibility.....	4
5.0 Associated Weakness & Hazards.....	4-5
6.0 Definitions.....	5
7.0 Procedure	5-6
7.1 Planning for provision of ladders & stairs	6
7.2 Types and requirements of ladders & stairs.....	7
7.2.1 Stairs can be of following types & requirements.....	7
7.2.1.1 Stair treads or landing / platforms.....	7-10
7.2.2 Ladder.....	10
7.2.2.1 Step Ladder.....	10
7.2.2.2 Vertical ladder	10-12
7.2.2.3 Mild steel tubular structural ladder for construction & maintenance.....	12
7.2.2.4 Manually propelled mobile ladder, stands & towers.....	12
7.2.2.5 Spiral Staircase	12
7.2.2.6 Other General guidelines.....	13
7.3 Requirement for appropriate ladders & stairs.....	13-14
7.4 Parts of a ladder / stair system	14
7.4.1 Platform / landing for a ladder / stair system	14-15
7.4.1.1 Entry / Exit Platform for vertical cage ladder.....	15-16
7.4.1.2 Types of platform / floor.....	16-18
7.4.2 Fall prevention – handrail, mid-rail and toe guard.....	18
7.4.3 Requirements for ladders & stairs	19
7.5 Use of ladders & stairs.....	19-20
8.0 Training	20-21
9.0 Monitoring & Reviewing	21
10.0 Annexure-I –	22-27
11.0 Annexure-II.....	28-37

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 4 of 37
		13 th July 2016

1.0 Purpose: This safety standard provides general guidelines & standard drawings / sketches of ladders & stairs for various plants & departments.

2.0 Reference : IS codes :8172 & 3696 part-II , Tata Steel Standard S3 29 80 01Rev. 7.0-September 2013 on “Straight steel staircases, ladders, platforms and hand railing“ of Tata Steel Services Ijmuiden Projects & Technical Consultancy.

3.0 Applicability: This standard is applicable to all locations of TATA STEEL LTD in India

4.0 Responsibility: Responsibility for implementation of this standard lies with all executing departments like Engg.&Projects, Engg.Services, Maintenance Department, Contractors, Consultants.& the operating departments.

5.0 Associated Weakness & Hazards:

Serious weaknesses & hazards under following different categories :-

Sl. No	Categories	Weaknesses	Hazards
1	Inadequacy of Design/ Drawing	a) Improper type of ladders/ stairs (as indicated in Annexure-I) b) Inadequate sizes of structural sections of the ladder /Stairs c) Inadequate weld lengths d) Inadequate cleats and gussets e) Missing of hand railings f) Missing / part existence, of C-guard(cage) g) Improper slope of stair flights h) Inadequate connections i) Use of various type of drawings of ladders / stairs	Implementation may cause collapse of ladder/ stairs / platforms, unstability of the structure, discomfort in access and use. With due course of time weakness, defects increases leading to failure of structure. Fears while accessing/descending etc.
2.	Members provided in design, not followed at sites	a) Under size sections used for ladders/stairs b) Ladders /stairs partly provided	Collapse of ladders / stairs . unstability of structure, discomfort in access and use. With due course of time weakness, defects increases leading to failure of structure. Fearness while accessing / descending etc.

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 5 of 37
		13 th July 2016

3	Construction not as per drawing	a) Make shift type work done for ladders/ staircases (a sample as shown in Annexure-1) b) Contractors authorised to put up approaches as per their wish.	Implementation may cause collapse of ladder/ stairs / platforms, unstability of structures, discomfort in access and use. With due course of time weakness, defects increases leading to failure of structure. fearness while accessing / descending etc.
4	Poor workmanship	a) At most of the joints welding is not uniform . Discontinuity and pores are existing. b) Connectivity of items non-standard c) Poor surface finish of the steel structurals of the ladder/stairs before painting d) Poor quality of paint & its application	Implementation may cause collapse of ladder/ stairs / platforms, unstability of structures, discomfort in access and use. With due course of time weakness, defects increases leading to failure of structure. Fears while accessing/descending etc.
5	Poor Inspection & rectifications	a) Dust deposition is quite high b) Painting is at various places worn out in a very short periods.	With due course of time weakness, defects increases leading to failure of structure. Fearness while accessing / descending, discomfort in access. etc.

Also work make shift arrangement, incompleteness of ladders / stairs and non-availability of hand railings in the manufacturer supplied items/structures/ equipment are other weaknesses which lead to hazards as described above.

6.0 Definitions:

6.1 Competent person - One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to people, and who has authorization to take prompt, corrective measures to eliminate them.

6.2 Qualified person - One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve or resolve problems related to the subject matter, the work, or the project.

7.0 Procedure: Access and egress from platforms / floors in plants and buildings / structures must be safe all the time. A safe and convenient means of fixed type access may consist of ladders & stairs . Therefore all ladders & stairs shall be designed, positioned & erected, accessed and used to ensure

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 6 of 37
		13 th July 2016

safety of the people approaching/accessing at various platforms / floors of a building / structures / equipment system etc.as well as workforce around.

7.1 Planning for provision of ladders / stairs:

- 7.1.1** Ensure availability of drawings of ladders & staircases for the buildings / structures. Check that any drawings being used for fixed ladders, stairs, hand railings and platforms for any modification / extension of existing / new structural steel work are as per standard drawings / sketches enclosed in this standards as annexure-II. In case of deviation the ladders & staircases are to be in line with the standard drawings.
- 7.1.2** Fabricator & erector to ensure final dimensions at site before fabrication & erection work undertaken to avoid unsafe positioning and site connectivity.
- 7.1.3** Fabrication & erection work are to be planned as per the specification, material and notes as specified in the standard. Ladders/stairs of Annexure-II.
- 7.1.4** In absence of drawings of ladders/ stairs required in a building/structures, standard drawings of Annexure –II to be followed.
- 7.1.5** The ladders & stairs are to be with hand rails, cages etc. as shown in the standard drawings.
- 7.1.6** Following deficiencies / weaknesses etc. which lead to hazards are to be addressed during planning stage:
 - Ignorance / unawareness of standard ladders / staircases
 - Improper utilisation of spaces in the structural buildings
 - Suitability and need for requirement of approaches not well understood
 - To make ladders / staircases with whatever material already available.
 - To go for ladder & stair provision as a layman work practice
 - Inadequate weld length, weld size
 - Poor painting work
 - Irregularity of inspection & maintenance of stairs & ladders
 - Manufacturer / supplier of tank, vessels/ equipment not made known to type of stair / ladders required. They must be furnished with standard drawings/ sketches so that care is taken by them during manufacturing stage .
 - Base of Ladders/stairs on ground shall be erected on a sound / firm / leveled surface to prevent collapse of ladders / stairs, due to settlement of soil. If needed due care shall be taken to stabilize the soil and concrete bases to be made as per drawings. No ladders/stairs shall be erected on loose soil and on muck.
 - In case of Steel structural platform / floor, the base of the ladders / stairs must be on the adequate steel beams/members.
 - Bases not to be directly on gratings/chequered plate without a steel beam/member/support just at the underside.
 - Bases on RCC /PCC floor must be connected to the insert plates or bolted / hilted with the floor.

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 7 of 37
		13 th July 2016

7.2 Types and requirements of Ladders / Stairs:

7.2.1 Stairs can be of following types & requirements :

- Ergonomic stairs as per standard drawings Nos : STD / 020120/A & STD/010031/A.
- Inclination, Riser & treads are to be as per the standard drawing.
- For rare used staircases or for limited / constrained spaces, width of stairs may be kept 600 mm minimum with hand railings on both sides. The width depends on the size of the occupied area that the stair leads to, combined with the level of occupancy of the area.
- Single flight stairs shall not be more than 12 steps max.
- For access to roof of a building/structure , staircase as per standards to be provided.
Only in case of non-availability of space , i) Inclined step ladders ii) Vertical ladders are to be used depending upon space suitability & level of occupancy

7.2.1.1 Stair Treads or landing / platforms

- Following are the types of treads / landings to be used in stairs:
 - i. MS chequered plate as per design and approved drawing.
 - ii. MS grating of zig-zag type as per standard drawing No : STD/010020/C & STD/020071/E
 - iii. MS grating of square type grating made of plates 6mm and above for medium to heavy duty purpose for tripper conveyor/ track hopper floor and other platform and floor as per approved drawing.
 - iv. MS Electro forge type grating as shown below as fig-i
 - v. Pressed grating treads with anti-slip edge as shown below in fig-ii, iib & iic

Suitability and basis of selection of types of treads shall be as per following :

- a. Availability of steel structural sections / manufactured gratings.
- b. Functional requirements : heavy duty / medium duty / light duty, purpose.
- c. For oily / hydraulic room , tank area etc. anti slip edge types of treads preferable.



Figure - i

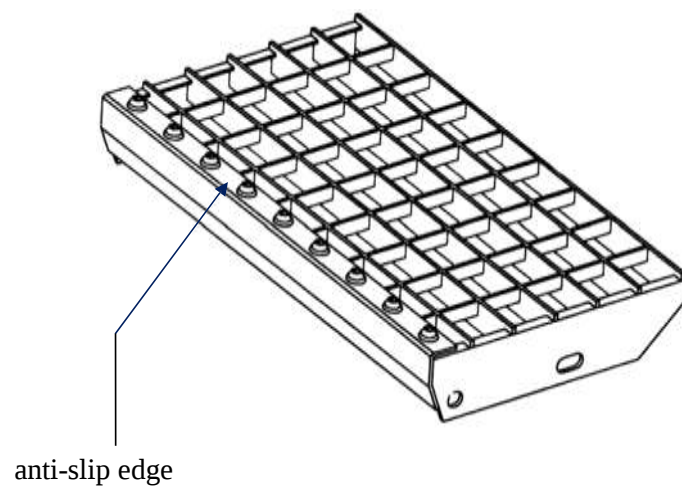
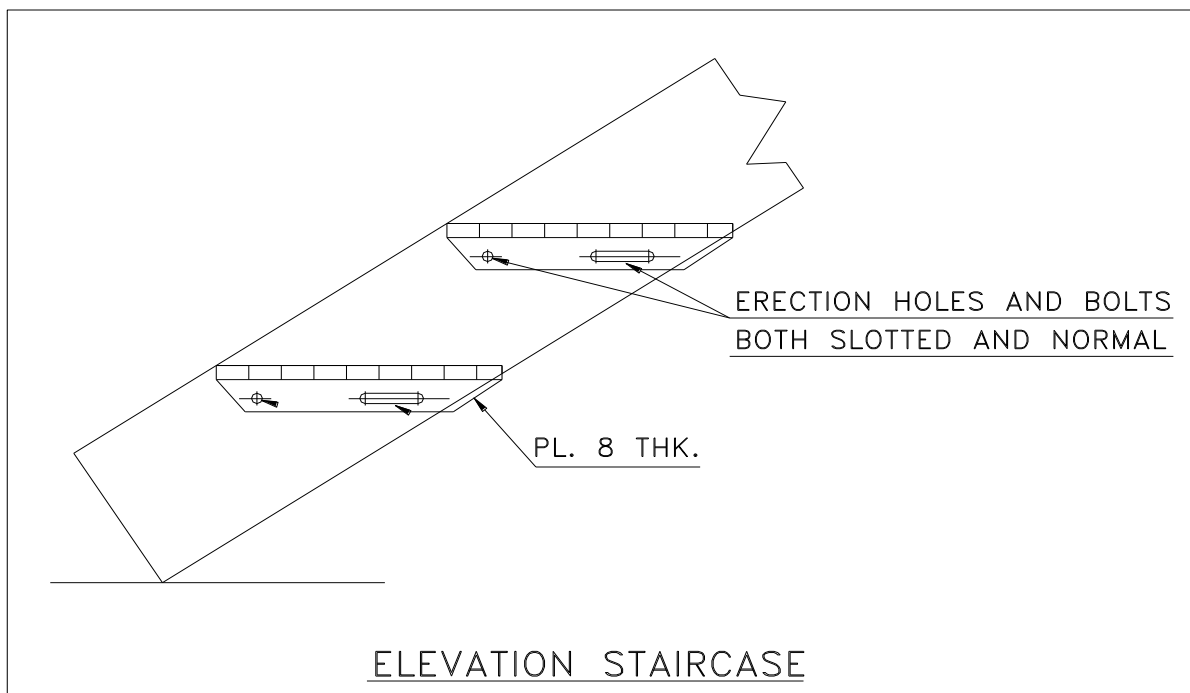


Figure-ii



Connection with wall / Steel structural stringer for the grating shown in iia

Note : i) After bolt connection the face plates to be welded with steel structural stringer

ii) For connection with wall, the chemically bonded hilty / equivalent bolts of diameter not less than 20mm.



Figure - iib



Stair treads made of grating with anti slip edge

Figure -- iic

7.2.2 Ladders :

7.2.2.1 Step ladders

- Inclined Step ladder shall be as per standard drg No- STD/020121/A & STD/P20122/0

For limited space locations / space constraint area where inclined ladders can not be provided, vertical ladders to be used.

7.2.2.2 Vertical ladder

- Vertical ladders without cage for landing height equal to or less than 2.5.
- Vertical ladders with cage for landing height between 2.5 M to 6.0 M
- Vertical ladders without cage for landing height between 2.5 M to 6.0 M shall be with vertical fall arrest system.
- For vertical ladders with cage with intermediate landings at every 6.0M (Max) to be used for height more than 6.0 M.

Resting platforms

A ladder with a climb height $H \leq 6$ meters may be built without resting platform. See figure iii. A ladder with a climb height $H \geq 6$ meters in length must have resting platforms. In that case the ladder flights may be max. 6 meters.

Ladders and resting platforms must be placed in such a way that the climbing route is displaced laterally after passing each resting platform. See figure iv & v.

See figure iv & v.

Position of resting platforms

Legend

- 1 Arrival
- 2 Departure
- 3 Intermediate platform
- 4 Ladder flight

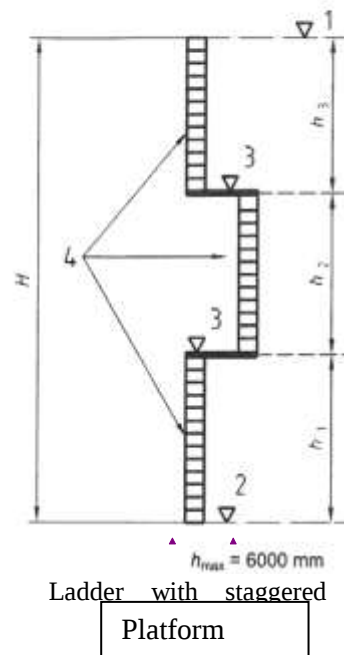
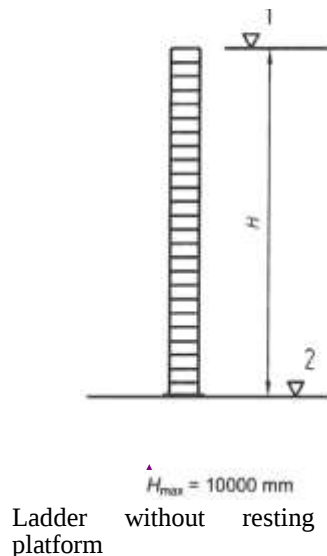
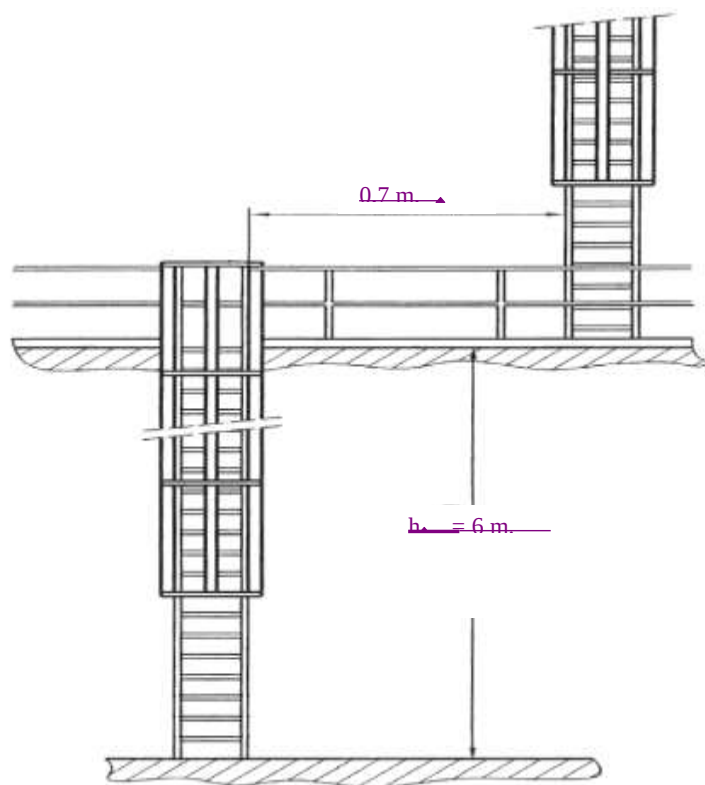


Figure - iva



Front view of a ladder with safety cage

Figure - v

7.2.2.3 Mild steel Tubular Structural Ladders for construction & maintenance:

This type is designed as modular system for sturdy and repetitive usage. Before its procurement/ usage approval of a competent & qualified person to be taken.

7.2.2.4 Manually Propelled Mobile Ladder Stands and Towers :

This type of ladders are to be as per Safety Standard SS/GEN-15 may also be used if already fixed staircases/ ladders can't be used or above ladders/stairs can not be provided.

7.2.2.5 Spiral Staircase:

- Spiral type stairs for chimneys are to be in line with the standard ergonomic staircases. The fixings and support system of spiral must be as per drawings approved by a competent and qualified Engineer of the department executing/performing the job.

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 13 of 37
		13 th July 2016

7.2.2.6 Other General guidelines :

- **For manufacturer supplied vessels, tanks, equipment, the standard ladder & staircase drawings must be part of the contract for the manufacturer supplied items. For maintenance of equipment at top of vessel / tanks the stairs / step ladders / rung ladders shall be as per space and functional suitability and with hand railing on both sides of ladders / rungs.**
- **C-rung type access not to be provided at any case.**
- **In case the standard drawings of ladders / stairs are not applicable for a particular case due to site / space constraints, drawings of ladders /stairs are to be developed and to be approved by a competent and qualified Engineer of the department executing /performing the job, before providing & using the same.**

7.3 Requirements for appropriate Ladders & Stairs:

- 7.3.1** Any steel ladder / stair in a plant / department to be provided based on approved design /drawings of ladders and stairs.
- 7.3.2** Design / Drawings shall be carried out by a competent & qualified Engineer.
- 7.3.3** Design & Drawings of ladders / stairs shall be as per IS Codes-8172, 5369 part-2 or approved design basis document / data. For indigenous / imported manufacturer supplied vessels, tanks, equipment, the standard ladder & staircase drawings must be part of the contract for the manufacturer supplied items. For maintenance of equipment at top of vessel / tanks etc. the stairs / step ladders / rung ladders etc. shall be as per space and functional suitability with hand railing on both sides of ladders / rungs.
- 7.3.4** Ladders / Stairs are to be rigidly connected with building or other structure.
- 7.3.5** Every structure and appliance used as a support for a ladders / stairs shall have a fixed & firm footing or be firmly supported.
- 7.3.6** Uprights of a ladders shall not be supported on loose bricks, boulders, concrete blocks, paver blocks.
- 7.3.7** The use of barrels, boxes, loose tile/brick blocks, pipes or other unsuitable objects as supports for landing of a stair is not permitted.
- 7.3.8** Conditions of supporting ground or structure shall be considered.

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 14 of 37
		13 th July 2016

- 7.3.9** Design shall be carried out as per the relevant Indian Standard or by any International standard or by approved Design Basis document / data.
- 7.3.10** The standard drawings for ladders / stairs shall be as enclosed in ANNEXURE-II
- 7.3.11** All Departments must follow the drawings of the standards ladders / staircases as shown in ANNEXURE-II
- 7.3.12** Nonstandard ladders / Staircases are to be replaced with standard ladders / staircases.
- 7.3.13** Inspection & strengthening of existing ladders/ staircases which are matching or in line with the standard ladders / staircases
- 7.3.14** Cleaning and Painting of existing retainable ladders / staircases
- 7.3.15** Tank. Vessels, equipment manufactures, supplier must be intimated about the standard for ladders / staircases before getting the supply.
- 7.3.16** For cases which are of rare access requirement, may be with staircase flight width of Minimum Size i.e 600 mm or vertical ladder with fall arrestor to be provided.
- 7.3.17** No objects are allowed to be hanging from the Staircase and its railings.

7.4 Parts of ladders & stairs system:

As shown in the standard drawings in Annexure –II..

7.4.1 Platforms / landings for Ladders & Stairs

- All platforms / landings may be provided with chequered plate / gratings or concrete floor and steel structural supporting beams / members at the underside of the chequered plate / grating.
- There shall be about no gap (Max.50mm) between ladder and landing / platform.
- Steel chequered plates / gratings as per drawings may be used with adequate stiffening.
- There should not be any opening in the platform except for allowing access to such platform./ landing / floor. All openings, if required for access, shall be guarded by means of hand-rail, mid-rail and toe guard along three sides and a suitable steel gate on the entry side.

- #### 7.4.1.1 Entry / Exit platforms for vertical cage ladders :

Diagram illustrating the layout and dimensions of a roof access platform. The platform is divided into two main sections: a curved section on the left and a rectangular section on the right.

- Horizontal Dimensions:**
 - Left section width: 1000
 - Right section width: 800
 - Total platform width: 1000
- Vertical Dimensions:**
 - Left section height: 250
 - Right section height: 1000
 - Total platform height: 1250
- Labels and Features:**
 - ROOFSURFACE:** Indicated by diagonal hatching above the platform.
 - landing platform:** A rectangular area within the right section, marked with a grid pattern.
 - MIN 500 point of entry/exit:** A curved section on the left, with a minimum width of 500 units.
 - TOP RAIL:** A horizontal line at the top of the platform, indicated by an arrow.

Figure- via

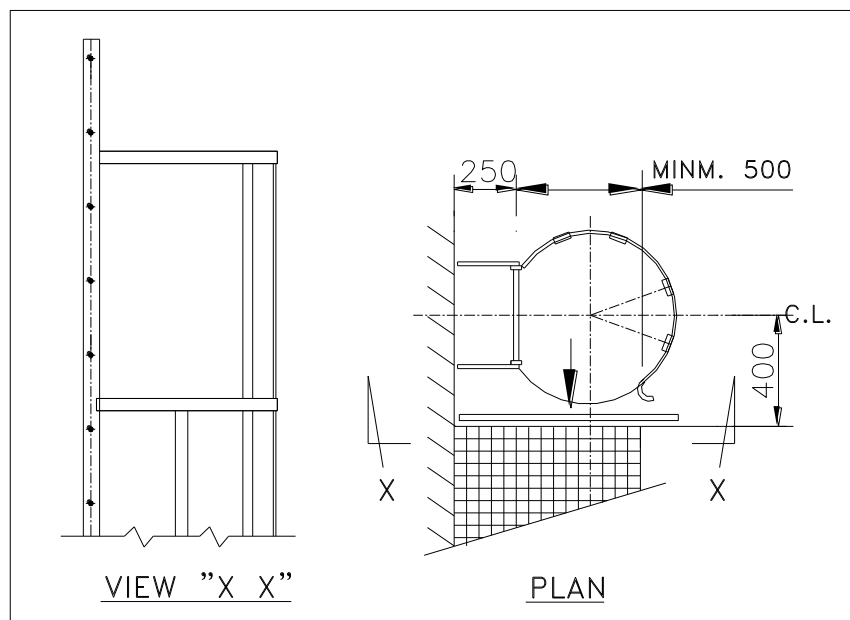


Figure – vi b

If there is a door for the platform, the width of the platform must be adjusted to allow for the width of the door frame.

The connections to roofs or platforms must be in a single horizontal plane.

If there is no railing along the edge of a roof, a railing must be placed on both sides of the entry/exit platform along the roof edge for a minimum of 4 meters.

Closing off access

If a caged ladder may not be climbed by unauthorized persons, the access should be closed off in such a way that its ability to act as an escape route is not compromised.

7.4.1.2 Types of Platform / floors

Following to be used for platforms/ floors:

- i. MS chequered plate as per design and drawings
- ii. MS grating of zig-zag type as per standard drawing No :
- iii. MS Electrofuge grating as shown below as fig-iii
- iv. MS general gratings made with plats / flats as per approved drawings.
- v) for oil reservoir or hydraulic rooms the gratings to be made of anti-slip version.
- vi) RCC floor

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 17 of 37
		13 th July 2016

Suitability and basis of selection for the types of platform floor shall be as per following :

- a. Availability of steel structural sections / manufactured gratings.
- b. Functional requirements : heavy duty / medium duty / light duty, purpose.

Note : Steel Gratings must be of two type of surface treatment:

- i) Anti corrosive hot dip bitumen paint as shown in the standard drawing
- iii) Hot deep galvanized

Other aspect :

- Main Bearing bars must be in span direction.
- Platform dimension at approach are to be as per fig – vii & viii.

The dimensions of the platforms near doors must be sufficient to safely enter and pass through the doors.

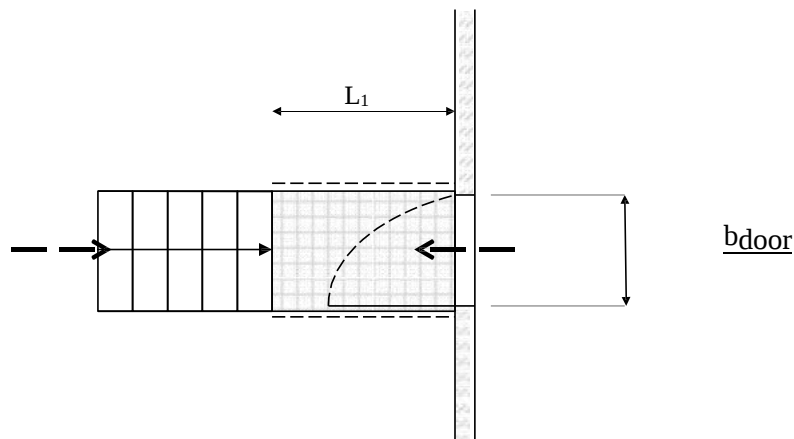


Figure- vii

For dimension L1 use:

$$L1 = b_{door} \text{ (door width) } + 500 \text{ mm}$$

This is an ideal situation. Minimal “extra” dimension of 300 mm is used. ($L1 = b_{door} + 300 \text{ mm}$)

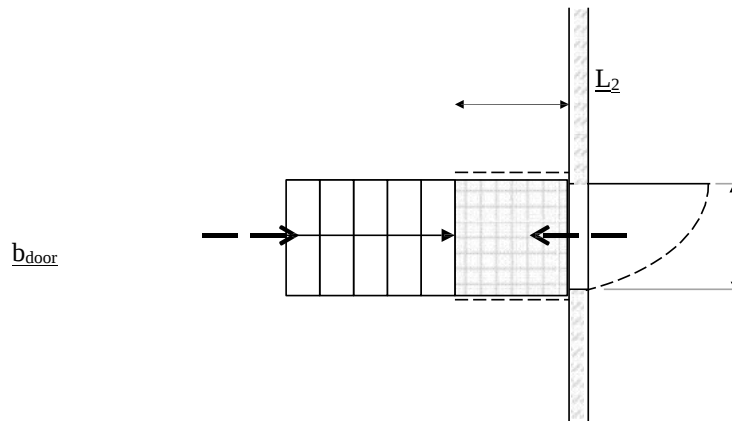


Figure - viii

For dimension L2 use:

L2 = door width

7.4.2 Fall prevention – handrail, mid-rail and toe guard.

- To eliminate fall exposures, stairs must have complete handrails, mid-rail and toe guards.
- Handrails shall be provided at a height of 1.0 meter and mid-rails shall be provided at a height of 0.5 m from the top of platform / landing
- Toe guards shall be provided all around the approach platform / landing and shall be of minimum 100mm high
- Fall arrest equipment cannot be used as a substitute for handrails, mid-rails, or toe guards..
- Slings, wire ropes or manila ropes cannot be used as substitute of hand rail or mid-rail.
- The hand railing is to be as per the standard drawing Nos-STD/010011/C & STD/010031/A.

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 19 of 37
		13 th July 2016

7.4.3 Requirements for ladders & stairs

- Both top and bottom should be secured to prevent displacement.
- Ladder rails should be extended at least 1.0 m above the landing.
- Last top rung of the ladder shall not be above the landing platform.
- Rungs shall be placed at uniform spacing of 300mm.
- Width of the ladder shall not be less than 300mm.
- All the ladders used for access should conform to the requirement of IS : 3696 (Part-2).
- **Ramps on platform / floor :** Every ramp shall :
 - be 430 mm wide if used for the passage of persons only.
 - be 600 mm wide if used for passage of materials.
 - not be steeper than 5(H):1(V)
 - Ramp to be made with chequered plate with adequate stiffening / gratings with steel structural beams/members as support at the underside..
 - There should not be any opening in the ramp.
 - Every side of a Ramp shall be provided with:
 - ❖ guard rail to a height of 1.00 m above the platform / floor
 - ❖ intermediate guard rail at not more than 500 mm height.
 - ❖ toe guard of at least 100 mm high.
- **Access for cross overs :**
 - Single flight ergonomic stairs on both side of cross over
 - Inclined step ladder on both side of cross over
 - Rung ladders with /without cage depending on height and to be on either side of cross over.

7.5 Use of ladders & stairs

- ### 7.5.1
- All new ladders / stairs provided in a plant / department shall be inspected by a competent & qualified person before use.

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 20 of 37
		13 th July 2016

- 7.5.2 Even the modified ladders / stairs shall be inspected by a competent & qualified person before use.
- 7.5.3 All the fixings of the ladders / stairs with the building/ structures shall be inspected by a competent and qualified person before use.
- 7.5.4 Inspection record shall be generated and signed by the inspector.
- 7.5.5 All corrective measures shall be taken by the plant / department, as per the inspection record and verified by the inspector.
- 7.5.6 Climb safely
- Face the rung while climbing.
 - Use both hands while climbing a ladder.
 - Do not carry materials while climbing
 - Keep one hand firmly on the ladder all the time.
 - Clean shoes and rungs before climbing, in order to avoid slipping.
 - Hold hand-rails while climbing a stair.
 - Do not use mobile phone while climbing.
- 7.5.7 Work safely
- Do not work on a slippery platform.
 - Do not work on a platform with projected nail or unguarded openings.
 - Do not overload materials on platform. Materials shall be kept in evenly distributed manner.
 - Do not loosen, detach or remove any component of the ladder/stair..
 - Stand only on the platform area. Do not try to extend work area by leaning out over the hand-rails.
 - Anchor the safety lanyard at a height of more than 1.0 meter to any other nearby stable structure. Lanyard may be anchored with the hand-rail, if no other independent structure is available. Lanyard must not be anchored with the mid-rail or with the platform/ landing.

8.0 Training:

Employees involved in the planning, provision of a ladder or stair, its erection, dismantling, moving, repairing /modification , etc., of ladders / stairs in a plant / department shall receive training from a competent & qualified person. The purpose of the training is to recognize any hazards associated with the work in question. Training shall consist of:

- the nature of ladder / stair hazards
- the correct procedures for adopting and providing a ladder / stair .
- the design / drawings information and intended use of the ladder / stair.
- Improper, inadequate & non uniform practices being followed for ladders/ staircases
- Drawings for ladders/ staircases not being followed
- Non application of Standard ladders/ staircases at various plants

Employees who perform work while on a ladder / stair shall be trained by a competent & qualified person so they can recognize hazards associated with the type of ladders / stairs being used and

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 21 of 37
		13 th July 2016

understand the procedures to control those hazards. Training will cover the following topics as necessary:

- The drawings of Ladders / Stairs
- Use of proper type of ladder / stair
- Material for the ladder / stair
- Connections of ladder / stairs with buildings/ structures.

9.0 Monitoring & Reviewing:

Frequency	: Six-monthly Inspection of existing / new steel ladders / stairs
Mechanism	: Inspection by a competent & qualified person
Records	: Inspection report
Responsibility	: Executing Department, Consultants, Contractor,

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 22 of 37
		13 th July 2016

ANNEXURE-I



Location:-oil cellar

Brief:- Sub standard ladder under use



Location:-Scale pit pump house

Brief:- (1) Non –standard ladder
(2) C-guard (cage) missing
(3) No argt. for side movement



Location:-DP#8

brief:- C-Guard not found.



Location:-DP#4

Brief:- No safe axis found to go to one
ladder to other ladder.



Location:-Scale pit

Brief:- C-Guard height to be increased.



Location:-Near DP#2

Brief:-Gap found on the mid of the platform,
person can fall at any time from the height.
(2) Access not found to climb on the ladder.



Location:-WRM canteen

BRIEF:- VERTICAL LADDER
WITHOUT C-GUARD.



Ladder without hand Rail



Vertical Ladder without C-guard



1. Vertical Ladder without C-guard
2. Size of vertical post sections inadequate
3. For inclined ladder hand railing & steps required



1. Non-standard ladder



Ladder is without C-guard and hand rail



Ladder is without C –guard and hand rail



Both ladder shows use of non uniform type of ladders at various plant & departments



Both ladder shows use of non uniform type of ladders at various plant & departments



- 1) Non- uniform type ladders
- 2) C-Guards missing



- 1) Non- uniform type ladders
- 2) C-Guards missing



Only C- rungs provided for approach



- j) Non- Standard Ladder, rungs in place of steps
- ii) Longer length of ladder without intermediate Support



No Hand railing on opposite sides

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 27 of 37
		13 th July 2016

Based on above following are the deficiencies/weaknesses/hazards :

- 1) Use of non -standard ladders / staircases at various Plants / work places of Works
- 2) Vertical inclined ladders are without steps.
- 3) Inclined ladders are without hand rails
- 4) Vertical ladders are without Cage (C-guard) for longer ladders
- 5) Single flight ladders for longer lengths
- 6) Sizes of sections of the ladders/staircases are inadequate / under or oversizes.
- 7) Even for use in ones upon a time, same type of larger ladders used.
- 8) Make shift fabrication & Erection of ladders/staircases without uniformity/ conformance to standard ladders/ staircases.
- 9) Use of undersize sections of ladders/staircases.
- 10) Use of varying types of sections for staircase stringers
- 11) Non-standard inclinations of the staircases
- 12) No uniformity of staircases even one working places
- 13) Staircases & ladders in most cases provided without following any drawings
- 14) Connectivity of the ladder/stair components in the assembly and connectivity with supporting structures Inadequate .
- 15) For approach in case of tank / vessels / cylindrical tanks only rungs are connected.
- 16) Ladder/stair cases are deposited with dust
- 17) Painting in various cases worn out resulting to corrosion /rusting of the ladders/ staircases
- 18) At various places only single person staircases required, but wider staircases provided.
- 19) For smaller diameter Chimneys ladders provided in place of staircases
- 20) Compromised stair/ladders due to space constraints.
- 21) Applicability of construction ladders as permanent ladders

	SAFETY STANDARD – STRUCTURAL LADDERS, STAIRS, PLATFORMS AND HAND RAILINGS SS/ENGG-21 , Version-00	Page 28 of 37
		13 th July 2016

ANNEXURE -II

LIST OF STANDARD DRAWINGS OF LADDERS/ STAIRCASES AND ENCLOSED DRAWINGS

- 1) Standard drawing of Staircase
 - i) Tata Drawing No: STD/020120/B
 - ii) Tata Drawing No : STD/ 010031/B

- 2) Standard drawing of inclined ladder
 - i) Tata Drawing No: STD/020121/A
 - ii) Tata Drawing No : STD/020122/0

- 3) Standard Drawing of Vertical Ladder
 - i) Tata Drawing No : STD/020123/0 (Without Cage)
 - ii) Tata Drawing No: STD/010032/A (With Cage)

- 4) Standard Drawings of Zig-Zag grating
 - i) Tata Drawing No : STD/010020/C
 - ii) TaTa Drawing No : STD/020071/E

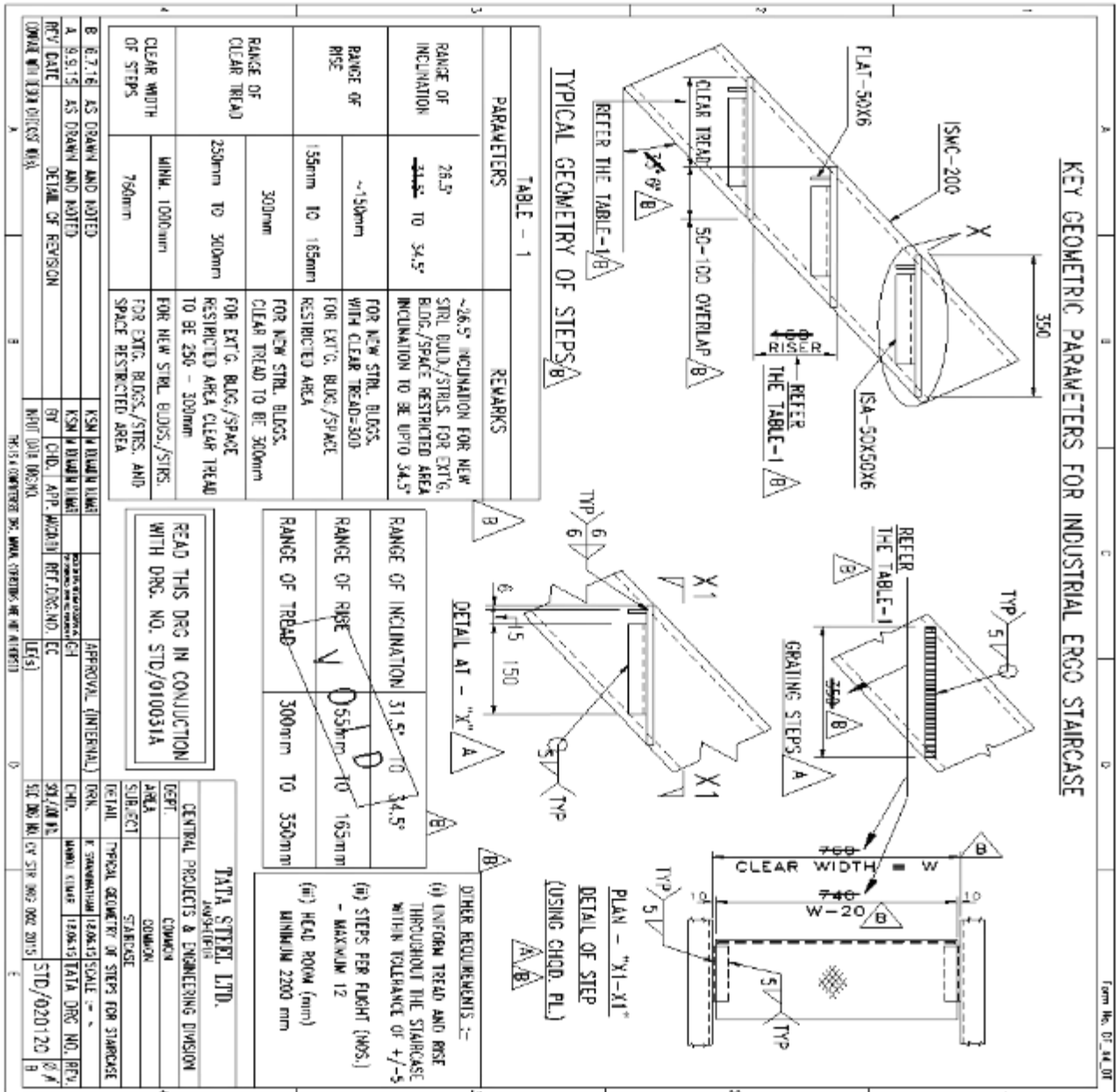
- 5) Standard Drawings of Hand Railings
 - i) Tata Drawing No : STD/010011/C
 - ii) Tata Drawing No : STD/ 010031/B

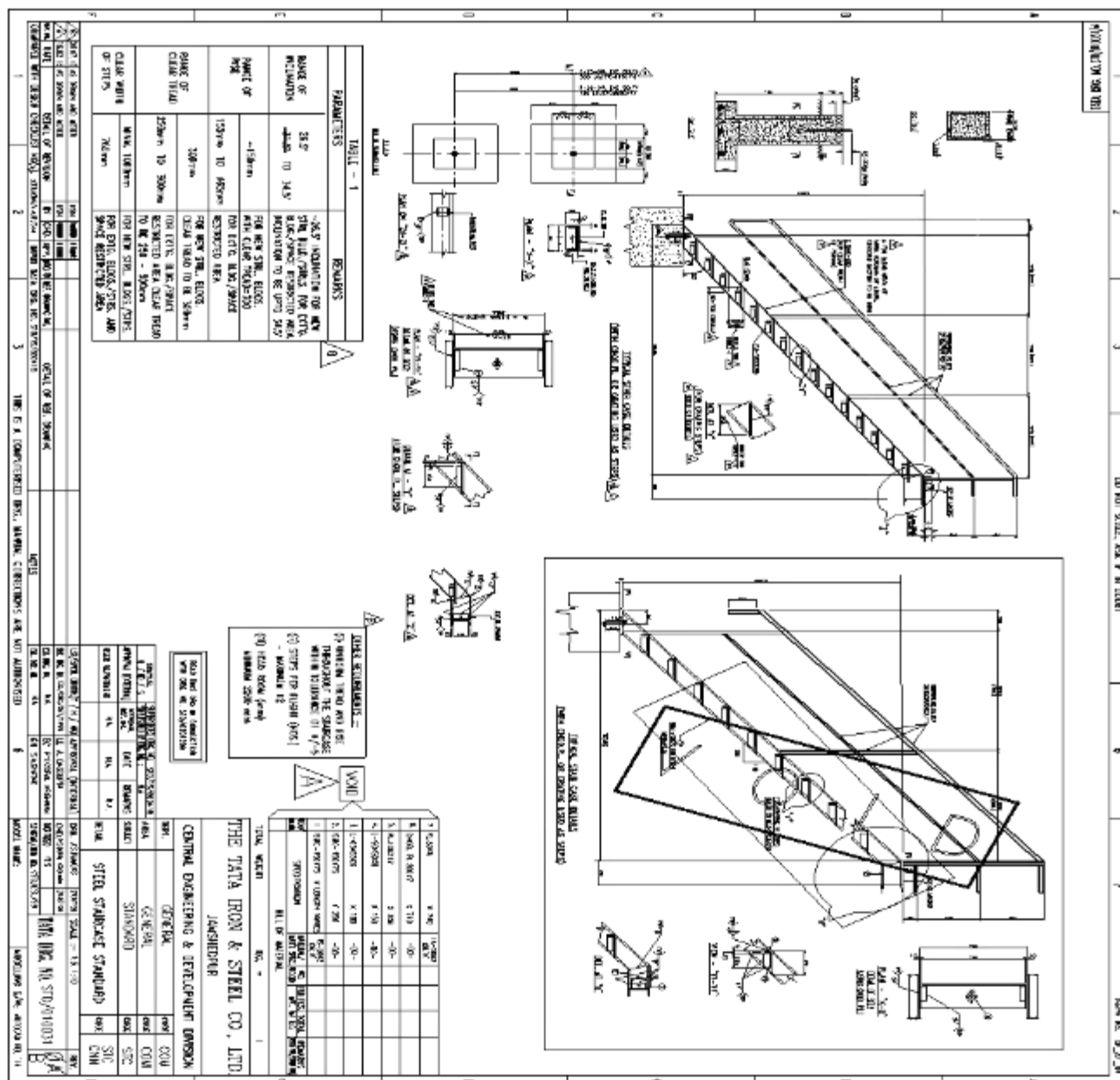
The Standard drawings can also be received from the drawing Archival of Engineering & Projects Department, Jamshedpur.

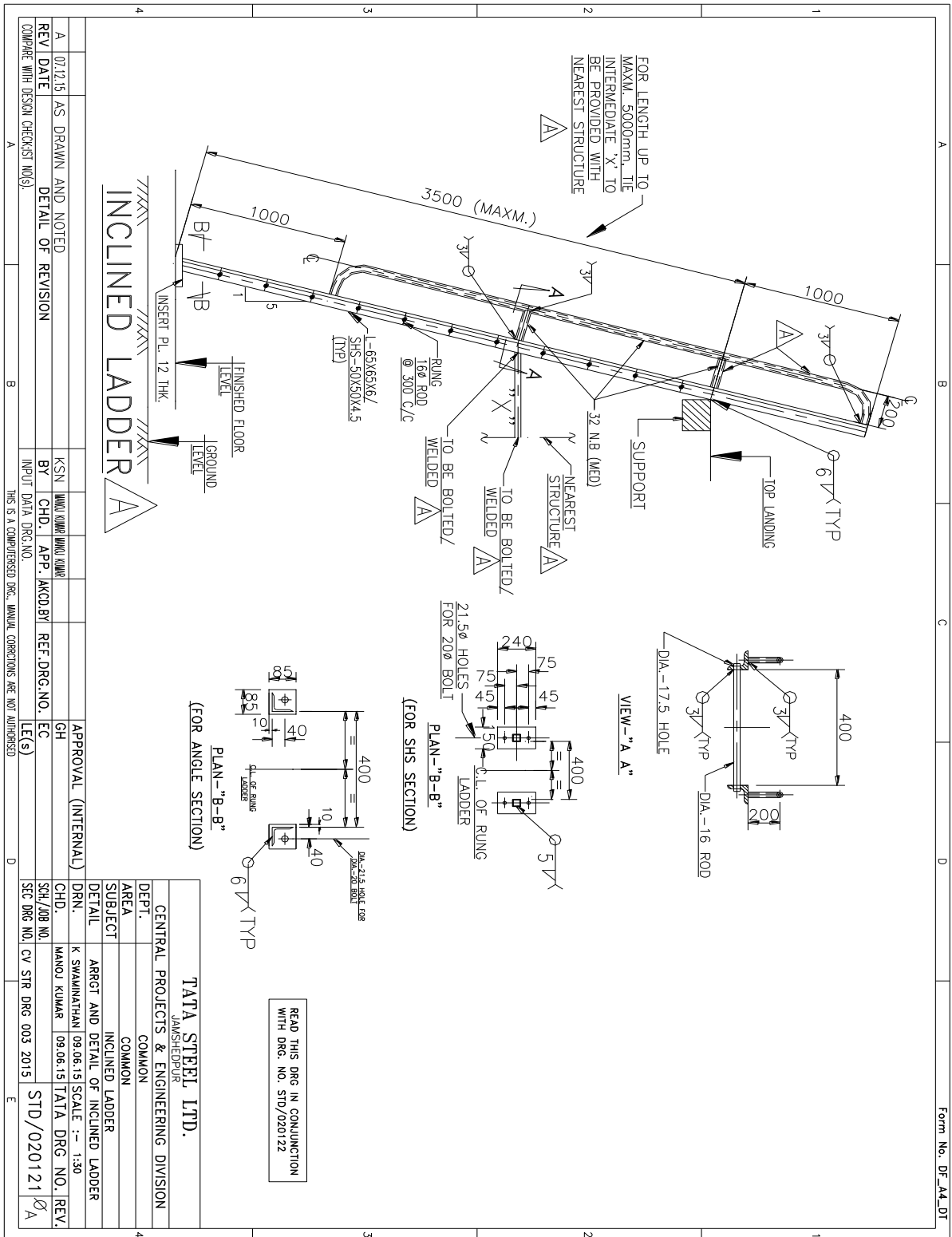
Approved drawings :- A drawing from authentic organisation shall undergo approval from a competent and qualified Civil & structural Engineer of the department executing & performing the related job.

SPECIAL NOTE : for any temp ladder /stair case or special purpose ladder/staircase the following steps to be followed :

- a) The standard drawings to be studied and implemented
- b) I case standard is not implementable, a drawing to be developed for the same and clearance to be taken from a competent and qualified Engineer of the Executing department which is performing the job.







STEP LADDER – 50° TO 75°									
ANGLE	PITCH	R (MM)	T (MM)	Z (MM)	X (MM)	Q (MM)	REMARKS		
50°	1.1918 : 1	240	201	1625	875	562	WIDTH MIN. = 500 DESIRABLE = 500-700 RISER (R) DESIRABLE = 200-250		
52°	1.2799 : 1	245	191	1600	875	540			
54°	1.3764 : 1	250	182	1575	880	518			
55°	1.4281 : 1	255	179	1550	880	505			
56°	1.4826 : 1	260	175	1525	885	495			
58°	1.6003 : 1	265	166	1500	885	469			
60°	1.7321 : 1	270	156	1450	890	445			
62°	1.8807 : 1	275	146	1400	890	418			
64°	2.0503 : 1	280	137	1375	895	392			
65°	2.1445 : 1	285	133	1350	895	378			
66°	2.2460 : 1	290	129	1325	900	366			
68°	2.4751 : 1	295	124	1300	905	339			
70°	2.7475 : 1	300	109	1250	910	312			
72°	3.0777 : 1	310	101	1200	915	282			
74°	3.4874 : 1	320	92	1150	925	256			
75°	3.7321 : 1	325	87	1100	935	242			

STEEL LADDER

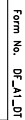
READ THIS DRG IN CONJUNCTION WITH DRG. NO. STD/020121

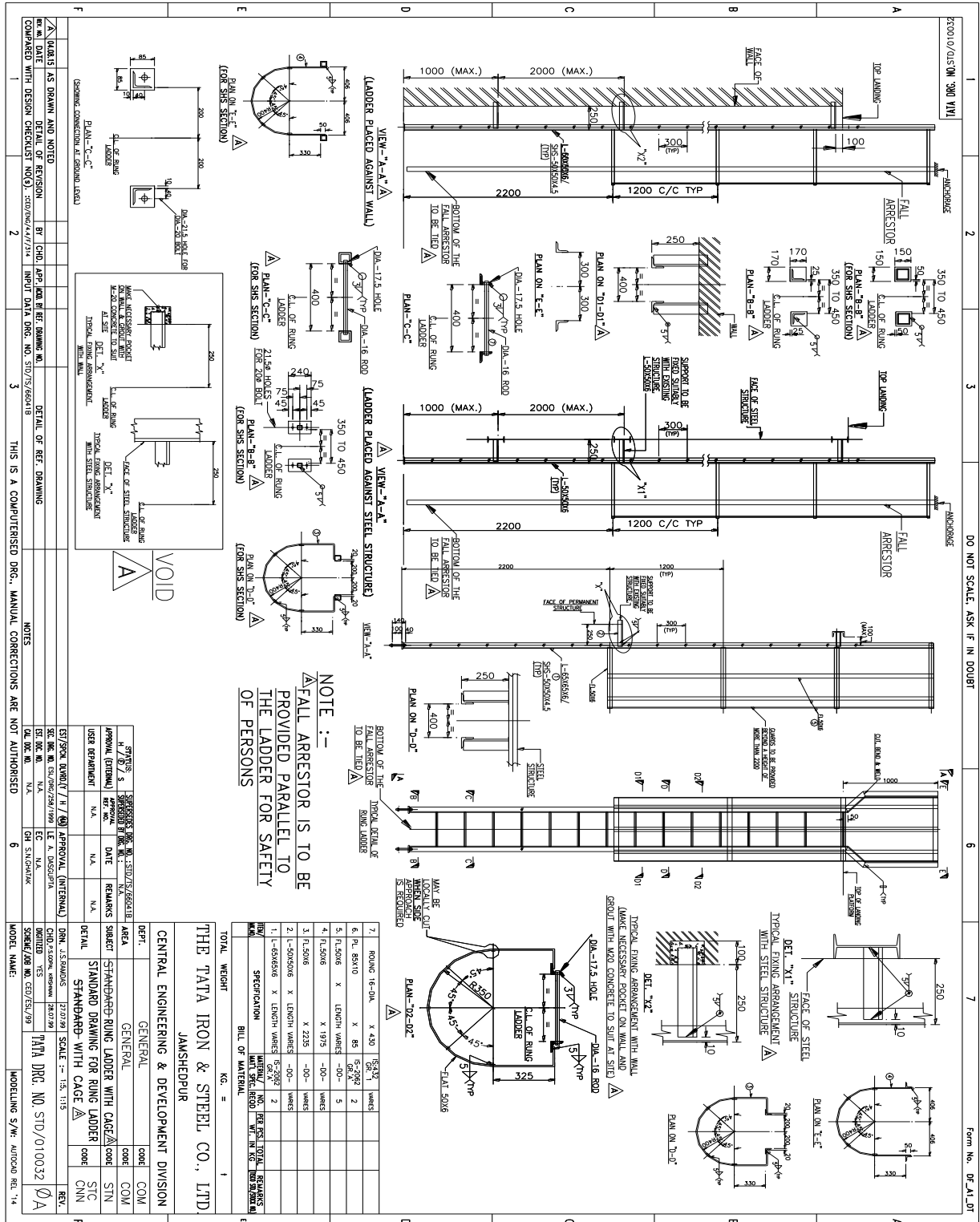
TATA STEEL LTD.
JAMSHEDPUR
CENTRAL PROJECTS & ENGINEERING DIVISION
COMMON
SUBJECT INCLINED LADDER
DETAIL STANDARD PROPORTIONS OF RISERS AND TREADS FOR STEEP LADDERS
DRN. K SWAMINATHAN 09.06.15 SCALE :- 1:30
CHD. MANOJ KUMAR 09.06.15 TATA DRG. NO. REV.
SEC DRG NO. CV STR DRG 004 2015 STD/020122

REV DATE DETAIL OF REVISION
COMPARE WITH DESIGN CHECKLIST NO(S).
A B C D E

THIS IS A COMPUTERISED DRG. MANUAL CORRECTIONS ARE NOT AUTHORIZED

Form No. DF_A4_DT





Form. No. DD/F-DSN/17; Rev. No. 0.0 (FORMAT 3)

COMPARED WITH DESIGN CHECKLIST NO. DD/L-DSN/01 INPUT DATA DRG. NO. / SK. NO. N.A.

REF. DRG. NO. N.A.

NOTES:

1. SELECT SPACING OF SUPPORTING FLOOR BEAMS TO GET MAXIMUM ADVANTAGE OF SPAN.
2. USE 1500mm. LONG MODULE AS MUCH AS POSSIBLE.
3. USE SHORTER MODULE AT ENDS ONLY FOR ADJUSTMENT IF NEEDED.
4. PAINTING OF GRATINGS TO BE DONE WITH ANTICORROSSIVE BITUMINOUS BLACK PAINT AS PER IS:158 WITH MIN. DFT OF 100 MICRON AT MANUFACTURER'S WORKS BY DIP METHOD FOLLOWED BY DRYING.
5. FOR DETAIL OF GRATING AT STEPS OF STAIR CASE REFER SK. NO. ~~CG/6366~~ **STD/020071E** **C**

TYPE	IMPOSED LOAD Kg./Sq.M.	SIZE OF BEARING BAR IN mm.	MAX. SPAN PERMITTED IN mm.	WEIGHT Kg./Sq.M.	APPROX. WEIGHT Kg./Sq.M.
A	250	25 X 3 30 X 4	1200	23.69	27.67 38.28
B	500	30 X 4 30 X 5	1200	33.13	38.28 45.32
C	750	30 X 5	1200	39.40	45.32
D	1000	25 X 3 30 X 4	750	24.20	28.17 38.97

ITEM NO.	DESCRIPTION	MATERIAL	NO. REQD.	PER PCE	TOTAL	REMARKS
BILL OF MATERIAL						
THE TATA IRON & STEEL CO.,LTD. JAMSHEDPUR				C.P. & D.D. (DESIGN)		
DEPT. GENERAL				STATUS : H / (F) / S		
SUBJECT STANDARD				SUPERSEDES DRG. NO. : CG/6332/C		
DETAIL DET'L. OF GRATINGS				SUPERSEDED BY DRG. NO. : N.A.		
DRN. V.M.K 26-08-98 EST./SPECN. DLVRD. (Y/N) N.A				SCALE :- N.T.S		
CHD. B.SANYAL 26-08-98 SEC. DRG. NO. ESL/DRG/040/98				SCHEME/JOB NO. CED/ESL/98		
KDC/DC N.A EST. DOC. NO. N.A				SK. NO. STD/010020		
DDM/ADM S.N.G 27-08-98 CAL. DOC. NO. N.A				REV ABC		

